

Claims

1. Method for simulating order processing processes used for producing a complex product, in particular a motor vehicle, characterized by the following steps:

- a) entering into a data processing device demand quantities for at least one class of the product for at least one predefined period of time,
- b) automatically adjusting, through use of a computer program installed on the data processing device, the demand quantities with predefined datasets that describe manufacturing capacities and/or (manufacturing) supplier capacities,
- c) automatically allocating the demand quantities or portions of the demand quantities to production sites (factories),
- d) simulating the production and/or supply for the production based on the allocation in step c),
- e) automatically determining the distribution channels and simulating the distribution(s) of the finished products from the factories to the delivery locations,
- f) storing and/or outputting at least a portion of the data generated in steps a) through e).

2. Method according to claim 1, characterized in that the data sets used in the automatic adjustment of the demand quantities in step b) include restrictions with respect to the production sites and/or suppliers.

3. Method according to one of the claims 1 or 2, characterized in that the demand quantities in step a) of claim 1 are determined by

- defining a first demand forecast for a first forecast time period,
- determining a second demand forecast for a second forecast time period by using stochastic processes derived from the first forecast, and
- determining the demand quantities according to defined algorithms which evaluate the first and/or second demand forecasts.

4. Method according to one of the claims 1 to 3, characterized in that the automatic adjustment in step b) of claim 1 includes a correction of the demand quantities so as to match the demand quantities to the manufacturing capacities and/or (manufacturing) supplier capacities.

5. Method according to one of the claims 1 to 4, characterized in that the process steps a) to c) of claim 1 include the following steps:

- defining preliminary demand numbers (demand forecast) for a first forecast time period, preferably for a year of sales,
- generating by simulation dealer orders for a second forecast time period, preferably for three months,
- evaluating the preliminary demand numbers and dealer orders and determining an updated demand forecast for the second demand time period,
- matching the updated demand forecast for the second demand time period to the capacities of the production sites and/or the suppliers, and determining approved firm order allocations and/or modular allocations,
- generating the demand numbers (assumptions) for the defined time period, preferably a delivery week, by evaluating the approved firm order allocations, modular allocations and/or simulated buyer orders newly received by the dealers,
- adjusting these demand numbers (firm orders) with respect to restrictions (capacity, utilization and the like) of the production site(s) and/or suppliers, and allocating the demand numbers (assumptions) to the production site(s).

6. Method according to one of the claims 1 to 5, characterized in that the demand numbers for the defined time period are distributed over the daily assumptions, when the demand numbers are automatically allocated to the production sites.

7. Method according to one of the claims 1 to 6, characterized in that the automatic allocation of the demand numbers to the production sites includes compiling daily schedules for the production sites.

8. Method according to one of the claims 6 or 7, characterized in that the automatic allocation of the demand numbers to the production sites includes breaking up the products specified in the daily assumptions into their modules.
9. Method according to one of the claims 1 to 8, characterized in that the demand numbers include information about significant equipment features of the products ("heavy items").
10. Method according to one of the claims 1 to 9, characterized in that the model on which the simulation is based models several production sites.
11. Method according to one of the claims 1 to 10, characterized in that the model on which the simulation is based, includes parameters characterizing a production site, such as
- capacity limitations,
 - work schedule models, and/or
 - permanent staffing.
12. Method according to one of the claims 1 to 11, characterized in that in the model on which the simulation is based, a differentiation is made between dealers, in particular between dealers of the domestic market and importers.
13. Method according to one of the claims 1 to 12, characterized in that in the model on which the simulation is based distribution, distribution channels are subdivided into distribution sub-channels.
14. Method according to one of the claims 1 to 13, characterized in that the data generated in steps a) to e) of claim 1 include
- quantitative evaluations of process designs,
 - assessments of strategies, for example with respect to managing disruptions,
 - times for freezing orders,
 - delivery times,
 - delivery reliability,
 - utilization of transportation means and/or
 - costs.

15. Method according to one of the claims 1 to 14, characterized in that data from databases of real systems, in particular from databases of dealers and/or production sites, are automatically evaluated during the process.

16. Simulation system, which includes the modules "forecast", "firm orders", "assumptions", "production", and "distribution", wherein the modules cooperate under the control of a computer program implemented on a computer system so that the following steps can be performed:

- a) entering into a data processing device demand quantities for at least one class of the product for at least one predefined period of time,
- b) automatically adjusting, through use of a computer program installed on the data processing device, the demand quantities with predefined datasets that describe manufacturing capacities and/or (manufacturing) supplier capacities,
- c) automatically allocating the demand quantities or portions of the demand quantities to production sites (factories),
- d) simulating the production and/or supply for the production based on the allocation in step c),
- e) automatically determining the distribution channels and simulating the distribution(s) of the finished products from the factories to the delivery locations,
- f) storing and/or outputting at least a portion of the data generated in steps a) through e).

17. Simulation system according to claim 16, characterized in that the simulation system includes interfaces to databases of real systems, such as the databases of dealers and/or production sites.

18. Computer program product with a computer-readable storage medium for storing a program which enables a computer, after the program is loaded into the memory of the computer, to execute a process for simulating order processing processes for producing a

complex product, in particular a motor vehicle, wherein the simulation includes the process steps according to one of the claims 1 to 15.

19. Computer-readable storage medium for storing a program which enables a computer, after the program is loaded into the memory of the computer, to execute a process for simulating order processing processes for producing a complex product, in particular a motor vehicle, wherein the simulation includes the process steps according to one of the claims 1 to 15.

20. Use of a method for simulating order processing processes according to one of the claims 1 to 15 or of a simulation system according to one of the claims 16 or 17 for determining planning data, such as optimization potentials, decision alternatives, performance figures for delivery times or delivery reliability, utilization of transportation means, costs, and the like.

21. Planning data, such as optimization potentials, decision alternatives, performance figures for delivery times or delivery reliability, utilization of transportation means, costs, and the like, which are provided by a method for simulating order processing processes according to one of the claims 1 to 15 or by a simulation system according to one of the claims 16 or 17.